REMARKS

Claims 1-27 were previously presented. A similar limitation to that found in claims 9 and 22 has been amended into independent claims 8 and 21, respectively. Thus, claims 9 and 22 are herein cancelled and claims 1-8, 10-21 and 23-27 all the claims pending in the application. Claims 1-8, 10-21 and 23-27 stand rejected under 35 U.S.C. §112, second paragraph, and also under 35 U.S.C. §103(a). Applicants respectfully traverse these rejections based on the following discussion. The following paragraphs are numbered for ease of future reference.

I.   The 35 U.S.C. §112, Second Paragraph, Rejection

[0001] Claims 1-27 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the Office Action questioned when in the method the production plan is created. The independent claims have been amended in order to overcome this rejection.

[0002] More particularly, referring to Figure 1, the embodiment of the present invention, like prior art production planning methods, include a receiving inputs step 101, a pre-processing step 102 (wherein input files are transformed into a form useable by a linear programming solver (see paragraph [0081]), a solving step 104 (wherein linear programming applications are used to determine a production plan, also referred to as an optimal raw output solution (see paragraphs [0080]-[0081]), and a post-processing step 106-108 (wherein the solution from the solver is transformed into a format acceptable for usage and output). However, in the embodiments of the present invention, the pre-processing and post-processing steps include additional steps.

[0003] For example, during pre-processing inputs are not simply transformed into a useable format. Additionally, during pre-processing, a first rescheduling process can be performed to reschedule "when said purchase order receipts are to be received by a plant so as to indicate that said purchase order receipts will be received by said plant during earlier time periods than initially specified". Furthermore, during post-process, the initial production plan (i.e., the solution generated by the linear programming applications) is not simply transformed into a useable format. Additionally, during post-processing, a second rescheduling process can be performed to reschedule "when said rescheduled purchase order receipts from said first rescheduling process are to be received by said plant so as to indicate that said rescheduled purchase order receipts will be received by said plant during later time periods than specified during said first rescheduling process without causing inventory balances to be depleted to zero" and, then, based on the initial production plan and the second rescheduling process, a final production plan can be generated and output. Thus, the final production plan in the present invention is based on both the initial production plan generated during the solving step and also on the second rescheduling process. The present invention has the advantage of allowing a linear programming solver to provide the vast majority of the decision making in determining the production plan, while incorporating the additional pre-processing and post-processing steps, as discussed above, to provide improved control of inventory in the final production plan (see paragraph [0012]).

[0004] In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

II.   The Prior Art Rejections

[0005] Claims 1-2, 4-10, 12-17, 19-23, and 25-27 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Edstrom (U.S. Patent No. 5,233,533), hereinafter referred to as Edstrom. Claim 3 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Edstrom in view of Kern, "Master Production Rescheduling Policy in Capacity-Constrained Just-In-Time Make-To-Stock Environments", hereinafter referred to as Kern. Claims 11, 18, and 24 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Edstrom in view of Lilly (U.S. Patent No. 6,088,626), hereinafter referred to as Lilly. Applicants respectfully traverse these rejections based on the following discussion.

A.   Rejection Of Claims 1-2, 4-10, 12-17, 19-23, And 25-27 Based On Edstrom.

[0006] The Applicants submit that the prior art reference does not anticipate or make obvious the following limitations of amended independent claim 1 (or the similar limitations of amended independent claims 8, 15, and 21): (1) "performing, by said computer, a first rescheduling process comprising rescheduling when said purchase order receipts are to be received by a plant so as to indicate that said purchase order receipts will be received by said plant during earlier time periods than initially specified"; (2) "after said performing of said first rescheduling process, solving core production planning system equations using rescheduled purchase order receipts associated with said earlier time periods from said first rescheduling process so as to determine an initial production plan"; (3) "performing a second rescheduling process comprising rescheduling when said rescheduled purchase order receipts from said first rescheduling process are to be received by said plant so as to indicate that said rescheduled

purchase order receipts will be received by said plant during later time periods than specified during said first rescheduling process without causing inventory balances to be depleted to zero"; or (4) "generating and outputting, by said computer, a final production plan based on said initial production plan and said second rescheduling process".

[0007] More particularly, per the Abstract, Edstrom discloses a scheduling method and apparatus that provides data and time allocation resources to a sequence of processes for manufacturing a desired item. Scheduling is performed by a backward-forward method and alternatively by an backward-jump forward method to meet a requested due date. Resources are dynamically allocated to satisfy processes according to pre-established rules for allocation. Also resources are allocated in certain amounts or in a predetermined pattern to minimize waste or left over amounts of the resource. To allocate certain resources, purchase or production of the resource is scheduled first.

[0008] The main procedure in Edstrom schedules manufacturing of an item with respect to capacity of resources according to two rules: (1) start processes (manufacturing steps) as late as possible to meet the due date; and (2) once the manufacturing steps of an item have been started, finish the steps as fast as possible (see col. 4, line 55-col. 5, line 2). Upon completion of the main procedure, a display indicates, for each item to be manufactured, a start date on which the manufacturing steps are to be initiated, an end date on which they will be completed, and a list of each of the manufacturing processes (including for each process, quantity of materials and a start and end time of use of resources) (see col. 5, lines 3-15). From this information, other reports may be generated (see col. 5, lines 15-25). Accordingly, the software program may be run each days to determine work schedule for that day or the next day, and for a determination of

materials that need to be ordered (see col. 5, lines 25-35).

[0009] The flow diagram of Figure 5 and the related text of Edstrom indicates that the method of Edstrom begins with a list of orders to be scheduled for manufacturing and this list is maintained in least slack sequence (least slack referring to the least number of days until the required completion day) (see col. 11, lines 30-49). The main procedure schedules each entry on the list list (i.e., plans out the use of resources required for satisfying the order), beginning with the first entry (i.e., the entry with the least slack) and, if materials required for the entry are wanting, the main procedure also places orders for the wanted materials (see col. 11, lines 50-60). As an order is scheduled, the order and all of its spawned orders (i.e., orders generated as a result of an original order) are stored in a list of scheduled orders and when the top level order schedules successfully, all of the spawned orders are transferred to a post schedule list to wait for performance according to the rule that once manufacturing processes are started for an order they are to run to completion as soon as possible (see col. 12, lines 10-20). All spawned orders of a parent order and the parent order itself are scheduled before the next original/parent order is looked at for scheduling (see col. 12, lines 20-24).

[0010] For each order, the scheduling process includes searching a routing file for the product number associated with the order to determine the sequence of processes required for manufacturing the item and the plant sites associated with each process (see col. 12, lines 25-39). Then, for each process, a record is formed in a process file that specifying the process, indicating the plant site for the process, leaving open a field for the begin date and the end date for the process (see col. 12, lines 40-59). Then, the series of processes for that order are backward-forward scheduled (see col. 12, line 60-col.13, line 2). That is, backward scheduling is attempted

(i.e., working from the shipment date backward) and if it can't be done forward scheduling is used (i.e., working from the current date forward) (see col. 13, lines 3-26).

[0011] In rejecting claim 1 (and similarly in rejecting claims 8, 15 and 21), the Office Action provides that Edstrom discloses the following:

"performing, by said computer, a first rescheduling process comprising rescheduling when said purchase order receipts are to be received by a plant so as to indicate that said purchase order receipts will be received by said plant during earlier time periods than initially specified (see column 2: lines 5-43; column 10: line 60 through column 12: line 24; in column 2: lines 13-21, the reference
discloses scheduling an event from the earliest allocated date);"

[0012] The Applicants respectfully disagree. Col. 2, lines 5-43, does not refer to a rescheduling process, as claimed, that involves the rescheduling of when purchase order receipts are to be received by a plant. Rather the cited portion, refers to a combination backwards and forward scheduling method to schedule resources required to complete a sequence of events in the manufacturing of an item (i.e., to satisfy an order). If events A, B, and C are required to be performed sequentially and by a target due date, the scheduling program starts at the target due date and looks backward in time for available resources to perform C. If a resource with the needed availability is found for C over a range of dates prior to the due date, then the software program allocates that resource to event C. The scheduling program then moves on to schedule B and so on. If necessary time to accomplish an event is longer than the earliest allocated day of a succeeding event and the present date, then the software program unschedules the previously allocated (backward scheduled) days and forward schedules the resources. That is, actual production planning is performed backwards and, if it can't be accomplished, then it is done forwards.

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[0013] Col. 10, line 46-col. 11, line 29, describe an order file. An order file in the invention of Edstrom is made for each order that is scheduled. The order file includes the product number, the plant site associated with that product number, a date by which the order must be finished, etc. Other fields in the order file include the schedule start date for manufacture for the order as assigned by the main procedure during backward-forward scheduling, the scheduled end date for manufacturing, the actual start date for manufacturing, the actual end date for manufacturing, etc.

[0014] As discussed above, col. 11, line 30-col. 12, line 24, further describes the Edstrom method as set out in the flow diagram of Figure 5. That is, the Edstrom method begins with a list of orders to be scheduled for manufacturing and that this list is maintained in least slack sequence (i.e., slack referring to required completion day) (see col. 11, lines 30-49). The main procedure then schedules each entry beginning with the first one with the least slack and, if materials required for the entry are wanting, the main procedure also places orders for the wanted materials (see col. 11, lines 50-60). As an order is scheduled, the order and all of its spawned orders (i.e., orders generated as a result of an original order) are stored in a list of scheduled orders and when the top level order schedules successfully, all of the spawned orders are transferred to a post schedule list to wait for performance according to the rule that once manufacturing processes are started for an order they are to run to completion as soon as possible (see col. 12, lines 10-20). All spawned orders of a parent order and the parent order itself are scheduled before the next original/parent order is looked at for scheduling (see col. 12, lines 20-24).

[0015] Thus, the cited portions of Edstrom refer to determining the sequence by which all

orders will be scheduled (e.g., a least slack sequence meaning that they are scheduled based on their required completion day). Once that sequence is determined, the resources required to complete each process for each order are scheduled (i.e., a production plan is developed), using a backward scheduling technique and, if that doesn't work, using a forward scheduling technique. That is, an attempt is made to generate an actual production plan for the order using a backward scheduling technique and, if that doesn't work (i.e., if the start date would fall on or before the present date), the production plan is made using a forward scheduling technique. Consequently, any new production plan generated by a forward scheduling technique would necessarily move up the previously scheduled start date to a later date (i.e., a date on or after the present date). Furthermore, nowhere in Edstrom does it actually disclose that prior to solving core production planning equations (i.e., prior to generating a production plan), a rescheduling process is performed to reschedule "when said purchase order receipts are to be received by a plant so as to indicate that said purchase order receipts will be received by said plant during earlier time periods than initially specified".

[0016] In rejecting claim 1 (and similarly in rejecting claims 8, 15 and 21), the Office Action provides that Edstrom further discloses the following:

"after said performing of said first rescheduling process, solving core production planning system equations using reschedule purchase order receipts associated with said earlier time periods from said first rescheduling process (see id.; the reference discloses creating a production plan)."

[0017] The Applicants respectfully disagree. As discussed above, the main procedure in Edstrom schedules manufacturing of an item with respect to capacity of resources according to two rules: (1) start processes (manufacturing steps) as late as possible to meet the due date; and

(2) once the manufacturing steps of an item have been started, finish the steps as fast as possible (see col. 4, line 55-col. 5, line 2). That is, as discussed above, the technique used in Edstrom lists the orders in least slack sequence, schedules the orders in sequence and for each order schedules/plans out resources for the process required to manufacture the ordered item. Using a backwards-forwards technique, Edstrom determines the date on which manufacturing of an order should start. Edstrom does not disclose solving core production planning system equations to determine an initial production plan based on a schedule of when purchase order receipts will be received by a plant or, more particularly, a schedule which indicates that such purchase order receipts will be received during earlier time periods than initially specified.

[0018] In rejecting claim 1 (and similarly in rejecting claims 8, 15 and 21), the Office Action provides that Edstrom further discloses the following:

"after said solving, performing, by said computer, a second rescheduling process comprising rescheduling when said rescheduled purchase order receipts from said first rescheduling process are to be received by said plant so as to indicate that said rescheduled purchase order receipts will be received by said plant during later time periods than specified during said first rescheduling process (see id.; in column 2: lines 32-43, the reference discloses rescheduling the target due date into the future)".

[0019] The Applicants respectfully disagree. Col. 2, lines 32-43, of Edstrom refer to an alternative technique to the backward-forward scheduling technique for planning the use of resources required in the manufacturing of an order item, as discussed above. This alternative technique is referred to as backward/jump forward scheduling. In this alternative technique, a first backward scheduling process is attempted. If the first backward scheduling process can not be accomplished, the software program calculates the amount of extra time needed beyond the present date to complete the sequence of processes, pushes the target due date into the future and

then performs a second backward scheduling process. Thus, a production plan generated using this backward/jump forward scheduling technique is based on the new/later target due date for completion of the order and on the results of the second backwards scheduling process. It is not based on a schedule of when purchase order receipts are to be received by the plant (or, more particularly, a schedule that indicates that the purchase order receipts will be received during later time periods than specified during the first rescheduling process) or on the results of the first backwards scheduling process.

[0020] Consequently, the Applicants submit that nowhere in the cited portion of Edstrom does it disclose that after an initial production plan is generated (i.e., after core production planning system equations are solved), a second rescheduling process is performed that comprises "rescheduling when said rescheduled purchase order receipts from said first rescheduling process are to be received by said plant so as to indicate that said rescheduled purchase order receipts will be received by said plant during later time periods than specified during said first rescheduling process" or, more particularly, that this is done so "without causing inventory balances to be depleted to zero". Furthermore, nowhere in the cited portion of Edstrom does it disclose "generating and outputting, by said computer, a final production plan based on said initial production plan and said second rescheduling process."

[0021] In rejecting dependent claim 5 and similarly in rejecting independent claims 8, 15, and 21, the Office Action indicated that the sorting limitation was disclosed at col. 11, lines 30-67. The Applicants respectfully disagree. As discussed in detail above, the method of Edstrom begins with a list of orders to be scheduled for manufacturing and this list is maintained in least slack sequence (least slack referring to the least number of days until the required completion

day) (see col. 11, lines 30-49). The main procedure schedules each entry on the list (i.e., plans out the use of resources required for satisfying the order), beginning with the first entry (i.e., the entry with the least slack). Thus, this portion of the cited prior art reference refers to the order in which orders are scheduled. It does not refer to a post-processing step, in which purchase order receipts that were rescheduled during pre-processing, are now sorted (e.g., based on a predetermined criteria, as in claims 8 and 21, or based on rescheduling flexibility, as in claim 15).

[0022] Therefore, the Applicants submit that amended independent claims 1, 8, 15 and 21 are patentable over the cited prior art reference. Further, dependent claims 2-7, 10-14, 16-20, and 23-27are similarly patentable, not only by virtue of their dependency from a patentable independent claim, but also by virtue of the additional features of the invention they define. Moreover, the Applicants note that all claims are properly supported in the specification and accompanying drawings, and no new matter is being added. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections.

B.   Rejection Of Claim 3 Based On Edstrom And Kern.

[0023] In rejecting claim 3, the Office Action acknowledges that Edstrom does not disclose a rescheduling process based on frozen zone rules. Thus, the Office Action cites Kern for the sole purpose of disclosing this limitation. The Applicants respectfully disagree as the cited portion simply refers to freezing a portion of a master production schedule in each planning cycle to cope with demand uncertainty. It does not refer to rescheduling when purchase order receipts are to be received by a plant based on frozen zone rules. Additionally, the Applicants

submit that Kern also does not disclose any of the other distinguishing features of the present invention as discussed above with regard to independent claims 1, 8, 15 and 21. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

        C.   Rejection Of Claims 11, 18, And 24 Based On Edstrom And Lilly.

[0024] In rejecting dependent claims 11, 18 and 24, the Office Action Acknowledges that Edstrom does not disclose the claimed limitation. Thus, the Office Action cites col. 11, lines 13-45 and cols. 9-14 of Lilly for the sole purpose of disclosing this limitation. The Applicants respectfully disagree, as the cited portions of Lilly consider available capacity to complete an operation during a time period, but do not reschedule "each of said purchase order receipts into the latest time period before the corresponding inventory level would be depleted to zero." Additionally, the Applicants submit that Lilly also does not disclose any of the other distinguishing features of the present invention as discussed above with regard to independent claims 1, 8, 15 and 21. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw these rejections.

III.   Formal Matters and Conclusion

With respect to the rejections to the claims, the claims have been amended, above, to overcome these rejections. In view of the foregoing, Applicants submit that claims 1-8, 10-21 and 23-27, all the claims presently pending in the application, are patentably distinct from the prior art of record and are in condition for allowance. Therefore, the Examiner is respectfully

requested to reconsider and withdraw the rejections to the claims and further to pass the above

application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the

Examiner is requested to contact the undersigned at the local telephone number listed below to

discuss any other changes deemed necessary. Please charge any deficiencies and credit any

overpayments to Attorney's Deposit Account Number 09-0456.

Respectfully submitted,

Dated: October 15, 2009

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